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Michael Bleaney* Manuela Francisco†

*University of Nottingham, michael.bleaney@nottingham.ac.uk

†World Bank and University of Minho, mfrancisco@worldbank.org

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Exchange Rate Regimes, Inflation and Growth in Developing Countries – An Assessment*

Michael Bleaney and Manuela Francisco

Abstract

Official and four alternative regime classification schemes based on observed exchange rate behaviour are used to examine the relationship with inflation and growth in 91 developing countries over the period 1984-2001. Apart from one scheme that produces markedly unfavourable results for floating (for reasons that are discussed in the paper), the consistent findings are that (a) floats have similar growth rates to soft pegs and only slightly higher inflation; and (b) hard pegs have lower inflation and slower growth than other regimes.

KEYWORDS: exchange rate regimes, growth, inflation

*The views and interpretations are those of the authors and do not represent those of the World Bank and its Executive Directors, nor the countries that they represent.

1. INTRODUCTION

For countries with weak monetary institutions, it is an important issue whether an external nominal anchor can provide the price stability that they cannot otherwise secure, and whether it can do so without sacrificing growth. The Asian crisis focused observers' attention on the fact that exchange rate regimes in developing countries are not always quite what they are claimed to be. This realisation stimulated the development of classification schemes other than those reported by the IMF which, up until then, had been self-declarations by countries' authorities. This proliferation of classification schemes has made it harder to reach a definitive answer to the question of the relationship between the exchange rate regime and macroeconomic outcomes, such as inflation and growth. For example, published results for different schemes suggest that in developing countries floating is associated with either significantly higher growth (Levy-Yeyati and Sturzenegger, 2003), significantly lower growth in some specifications (Husain *et al*., 2005), or no significant difference (Ghosh *et al*., 2002).

Can these differences be resolved, or at least better understood? Potential sources of difference are the setting of the boundary between a peg and a float, the use of different samples, or the peculiarities of a particular classification algorithm. We show here that, despite a surprising degree of disagreement across schemes in classifying particular observations, the broad picture is that the choice of exchange rate regime makes little difference to inflation and growth in developing countries. There are two exceptions to this. One is that hard pegs tend to be associated with significantly lower inflation than soft pegs or floats. The other is that one widely used classification scheme tends to produce outlying results. Although this scheme identifies fewer floats than others, it seems more likely that it is essentially some unintended features of the classification algorithm that make it an outlier.

Even using the officially declared regime, there are aggregation issues in reducing the ten or so categories to a smaller number. Throughout this paper we distinguish three categories: floats, easily adjustable pegs ("soft pegs") and those where adjustment is harder ("hard pegs", defined by use of a shared currency or a currency board system). It is important to separate out hard pegs because constraints on devaluation may be critical to the effectiveness of a peg as a nominal anchor.

We investigate four alternative classification schemes that purport to measure what the exchange rate regime is rather than what is declared to be. The four schemes are those of Bubula and Ötker-Robe (2002), Levy-Yeyati and Sturzenegger (2005), Shambaugh (2004) and Reinhart and Rogoff (2004). Details of these schemes are discussed in the next section. The correlation between these classification systems, beyond the obvious cases, is surprisingly low, and not just

because behaviour differs from official claims: alternative *de facto* classification systems produce disconcertingly different results (Bleaney and Francisco, 2007a). Here we focus on what difference this makes to the empirical relationship between exchange rate regimes and macroeconomic outcomes (inflation and growth) in developing countries, which are more likely than advanced countries to have weak monetary institutions and therefore to rely on an exchange rate peg for monetary credibility. Such a policy is considerably less attractive if there is a growth penalty attached.

We focus exclusively on the statistical association between macroeconomic outcomes and exchange rate regimes, and we do not attempt to identify causality. This is partly because the persistence of regimes makes causality issues difficult to resolve, and partly because causality only becomes an issue once a statistical association has been established.

Table 1. Details of Classification Schemes and Findings for Developing Countries

Scheme	IMF	Bubula and Ötker-Robe	Levy-Yeyati and Sturzenegger	Reinhart and Rogoff	Shambaugh
Methodology	Country's self-declaration	Self-declaration checked against other sources and exchange rate volatility	Cluster analysis based on volatility of exchange rate and international reserves	Uses parallel rate where available. Float requires >20% months in 5-year span with >5% change in rate	Peg defined as no change in parity in 11 out of 12 months or exchange rate stays within 2% range
Dating	Monthly	Monthly	Calendar year	Monthly	Calendar year
Findings with respect to inflation	Hard peg < soft peg < other regimes	Hard peg < other regimes	Hard peg < other regimes	Peg < float	Not investigated
Findings with respect to growth	No significant differences	No significant differences	Peg < float	No consistent differences	Not investigated
Source of findings	Ghosh *et al*. (2002)	Bleaney and Francisco (2005)	Levy-Yeyati and Sturzenegger (2001, 2003)	Husain *et al*. (2005)	
Sample period	1970-99	1991-2001	1974-2000	1970-99	
Categories used	Hard peg; soft peg; intermediate; float	Hard peg; soft peg; floats	Peg; crawling peg; managed float; free float	Pre-announced or de facto peg; limited flexibility; managed float; free float	Peg; float
High-inflation observations separated out?	No	Yes	No	Yes	No
Stringency of definition of peg	Medium	Medium	Medium	Low	High

2. CLASSIFICATION SCHEMES

Table 1 summarises the main features of classification schemes and the empirical results obtained with them. Schemes differ quite markedly in methodology. In investigating the relationship between exchange rate regimes and macroeconomic outcomes, many authors use several specifications (e.g. with or without country fixed effects; with or without additional control variables) in order to test robustness, so Table 1 focuses on the main results.

The IMF classification scheme has been extensively analysed by Ghosh *et al*. (2002). Using a large data set of 147 countries over a thirty-year period (1970-99), they find that, according to official IMF classifications, pegs are associated with significantly lower inflation than intermediate regimes (such as crawling pegs or tightly managed floats) or floats, except in the advanced countries. With a finer classification of regimes (their Table 6.3), they find that hard pegs have the lowest inflation, but that other pegs still have lower inflation than more flexible regimes. They find no robust difference in growth rates across regimes.

Bubula and Ötker-Robe (2002) [hereafter BOR] backdate the IMF practice begun in 1999 of checking the self-declared exchange rate regime against other statistical and documentary evidence about the official exchange rate. A regime is only defined as a peg if there is documentary evidence of a policy of pegging, as well as exchange rate stability.[1] Although their classification is not available before 1990, it is of interest because of its close affiliation to the IMF's current methodology, which is essentially an informed observer's judgement about the *de facto* regime. With respect to inflation and growth, the BOR classification produces similar results to the IMF classification (Bleaney and Francisco, 2005).

Levy-Yeyati and Sturzenegger (2005) [LYS] use cluster analysis to generate one observation per calendar year, based on three variables: the volatility of the nominal exchange rate level against the identified anchor currency (average absolute monthly percentage change), the volatility of exchange rate changes (standard deviation of monthly percentage changes), and the volatility of foreign exchange reserves (average absolute monthly percentage change in net dollar international reserves relative to the dollar value of the monetary base in the previous month). This last is intended as a measure of the commitment to managing the exchange rate, but since what is used is a measure of actual intervention, which may vary considerably even though the commitment remains unchanged, it is probably at least partly responsible for the large number of regime switches in this classification. Using this classification, Levy-Yeyati and

[1] They write (p. 11): "[w]hen available information indicated that the authorities targeted to keep the exchange rate stable and the exchange rate remained within a range less than 2 per cent for at least four months vis-à-vis a given currency, the regime was classified de facto as a conventional fixed peg."

Sturzenegger (2001, 2003) claim that floats are associated with significantly higher growth in non-industrial countries, by about one percentage point *per annum*.

Shambaugh (2004) [JS] aims only to differentiate pegs from other regimes. For a peg classification, the nominal exchange rate must remain within a two per cent band within the year, or have zero movement for eleven out of twelve months, which is a relatively strict definition that, for example, excludes all crawling pegs. If neither criterion is met, the regime is a non-peg. Like LYS, his scheme generates annual classifications only. Up to now macroeconomic outcomes have not been investigated using this classification.

Finally, Reinhart and Rogoff (2004) [RR] use a classification methodology based on the *parallel* rather than the official exchange rate, where such a rate exists. The use of the parallel rate is unique to this scheme, and may well be responsible for the rather different results that we obtain with it. The authors justify it on the grounds that, where the parallel rate premium is high, the official rate ultimately moves towards the parallel rate rather than *vice versa*. We discuss this issue further below. Their statistical approach is based purely on exchange rate movements, on the grounds that reserve movements are an unreliable measure of exchange market intervention. They allow regimes to be categorised as a peg or a band even if a significant minority of exchange rate movements is large, based on rolling five-year windows.[2] Husain *et al.* (2005, Table 9), using the RR classification for 1970-99, conclude that in developing countries (other than emerging markets), exchange rate flexibility is associated with significantly higher inflation, but it is unclear whether this finding is robust to the separation of hard and soft pegs. In some of their regressions intermediate regimes appear to have significantly higher growth rates.

Various issues emerge from this body of work. One is that distinguishing devaluations from genuine flexibility of the exchange rate is a problem for any statistical algorithm. Under the LYS scheme one sizeable devaluation can be sufficient to cause a year to be classified as a float, because of its impact on the exchange rate volatility measures (e.g. the CFA franc in 1994). The JS and RR schemes allow infrequent large changes in their definition of a peg in order to avoid this pitfall. A judgemental approach has less of a problem in this respect.

A second issue is the treatment of episodes of extreme inflation. Reinhart and Rogoff (2004) show that these episodes are characterised by exceptionally low growth, so their inclusion can distort the results. Like RR, we separate all observations with an inflation rate over 40% into a "freely falling" category, and mostly omit them from the analysis.

[2] Any monthly observation falls in 60 such rolling windows. For the observation to be classified as a float, none of these 60 rolling windows must meet the criteria for some form of peg or band. It is perhaps not surprising, therefore, that floats are relatively infrequent in this classification.

A third problem is the choice of regime categories. Crawling pegs are often put into an intermediate category, but that tends to make the classification endogenous to the inflation rate. For this reason we avoid an intermediate category, and classify crawling pegs as pegs.[3] As already mentioned, we also separate hard from soft pegs. We define hard pegs as currency board systems and the absence of a separate legal tender. Currency boards incorporate rules preventing sterilisation of reserve losses, and the parity is frequently backed by legal commitments. Lack of a separate legal tender means that devaluation cannot be a unilateral decision (as in the case of currency unions such as the CFA zone) or is effectively impossible (where the country has adopted the currency of a much bigger country, commonly referred to as dollarisation).[4] Since not all schemes separate out hard pegs, we impose a common definition across all classification schemes; consequently the differences across schemes relate to the distinction between soft pegs and floats.

For each classification scheme, we separate the observations that are not hard pegs and not "freely falling" into soft pegs and floats. Floats are those that are described as free, managed or dirty floats. Other regimes that are sometimes lumped into an intermediate category, such as crawling pegs or bands, we label as a form of soft peg. The one exception to this is the JS classification, which uses a relatively narrow definition of a peg, and categorises everything else as a non-peg.

3. THE DATA

We use annual data for all developing countries other than transition countries from 1984 to 2001 from *World Development Indicators*. We exclude transition countries because they were socialist economies in the 1980s and in a transitional state for much of the 1990s. The classifications are as published by the originators of the schemes.

There is an important timing issue. For the classification schemes that generate monthly observations (IMF, BOR, RR), we compare macroeconomic outcomes for a calendar year with the exchange rate regime in place *at 31 December of the previous year*, to minimise endogeneity problems. For the LYS and JS schemes, that generate only calendar-year observations, we focus on the previous-year classifications, but we also check that the results are not markedly different using the current-year classifications.

It is instructive to analyse the 617 observations that are common to each classification and which are not hard pegs or inflationary crises. As Table 2

[3] This does not apply to the JS classification, in which crawling pegs are classified as non-pegs along with floats.

[4] This definition of hard pegs is standard (e.g. Bubula and Ötker-Robe, 2002).

shows, the proportion of these observations classified as floats rather than soft pegs is 41.1 per cent for the IMF classification, 71.0 per cent for the JS classification, 45.7 per cent for the LYS classification, 28.2 per cent for the RR classification and 49.9 per cent for the BOR classification. Thus alternative classifications vary considerably in the proportion of floats identified. These differences primarily reflect the stringency of the definition of a peg. For example, if the monthly exchange rate movement exceeds 5% in less than 12 months of a 60-month rolling window, that would be sufficient for RR to classify the regime as a band rather than a float for all 60 months.[5]

Perhaps more surprising are the rather low correlations between the classifications in relation to the identification of floating regimes as opposed to soft pegs, with the exception of the IMF/BOR pair (see Table 2). The correlation between the IMF and BOR classifications is 0.64, but *de facto* schemes agree even less with each other than with the *de jure* classification. The average correlation with other classifications is 0.36 for IMF, and varies from 0.40 (BOR) down to 0.16 (RR) for the alternative classifications. What this indicates is that purely statistical methods of identifying exchange rate regimes produce markedly different results not only from other approaches, but also from each other. Perhaps most notable is the fact that the RR classification, based on parallel rates, is something of an outlier.

Table 2. Correlations between Classification Schemes

	CLASSIFICATION SCHEME					
	IMF	JS	LYS	RR	BOR	Proportion of floats
IMF	1					0.411
JS	0.37	1				0.710
LYS	0.28	0.38	1			0.457
RR	0.15	0.08	0.05	1		0.282
BOR	0.64	0.38	0.24	0.35	1	0.494
Mean	*0.36*	*0.30*	*0.24*	*0.16*	*0.40*	

Notes. The correlations refer to a common sample of 617 observations excluding hard pegs and inflationary crises, except in the case of the BOR classification which is unavailable before 1990. For the BOR classification the sample is 413 observations. The final column gives the proportion of observations identified as floats in each classification scheme.

[5] Floats with naturally low volatility, such as Canada and Switzerland, do not appear as floats in the RR classification for this reason.

4. EXCHANGE RATE REGIMES AND INFLATION

We are now ready to examine the relationship between exchange rate regimes and macroeconomic performance. In order that the results should not be unduly distorted by outliers, we exclude the cases of extremely rapid exchange rate depreciation (defined by Reinhart and Rogoff (2004) as "freely falling"). We also transform the inflation rate as $\frac{100p}{100+p}$, where p is the percentage change in the consumer price index since the previous year. This is less than but very close to p for small positive p, but tends to 100 as p tends to infinity, thus compressing differences at the high end of the range.

Since inflation tends to be persistent, we estimate the following regression separately for each classification scheme:

$$\pi_{j,t} = a + b_0\pi_{j,t-1} + b_1 DHP_{j,t-1} + b_2\, DFLOAT_{c,j,t-1} + \text{year dummies} \qquad (1)$$

where $\pi_{j,t}$ represents inflation in country j in year t, $DHP_{j,t-1}$ is a dummy for a hard peg, and $DFLOAT_{c,j,t-1}$ is a dummy for a float as identified by classification scheme c for that observation at the previous 31 December (or calendar year in the case of JS and YS). Year dummies are included to control for global inflation fluctuations that affect all the countries in the sample, but no country fixed effects are included.[6]

Table 3 reports the results of estimating equation (1) for the various classification schemes. The hard-peg dummy compares average inflation rates for hard pegs (which are similarly defined across all classifications) with the omitted category of soft pegs (whose definition varies with the classification). The float dummy compares average inflation rates for floats with those for soft pegs.

The hard peg dummy is consistently highly significant and negative. Its coefficient indicates a short-run effect on inflation of about –2.5 percentage points, and a long-run effect (allowing for the coefficient of 0.5 on the lagged dependent variable) of about twice that, relative to a soft peg. Subject to the caveats mentioned above regarding causality, this suggests that putting obstacles in the way of devaluation helps to promote price stability. The float dummy is

[6] The lagged dependent variable is highly significant for both inflation and per capita growth, although it is omitted by many authors (e.g. Husain *et al*., 2005; Levy-Yeyati and Sturzenegger, 2003), who also estimate regressions with country dummies and/or or a series of control variables that in practice operate rather like country dummies because their cross-country ordering changes little over time (e.g. GDP per capita). Country dummies reduce the effective sample to those countries that have switched regime, which is untrue of most hard-peg countries, and consequently makes the hard-peg effect much less precisely identified, as we show in an earlier version of this paper (Bleaney and Francisco, 2007b).

statistically significant in only two out of five cases. Its coefficient, which is always positive, suggests a relatively mild effect: a short-run impact of about one percentage point, and therefore a long-run effect of about two percentage points. An exception is the RR classification, for which the float dummy has a much larger coefficient (+3.7). Why the RR classification might produce different results will be discussed later. [7]

Table 3. Inflation and Exchange Rate Regimes

	CLASSIFICATION SCHEME				
	IMF	JS	LYS	RR	BOR
Constant	2.78** (0.61)	2.50** (0.64)	3.47** (0.73)	3.25** (0.58)	2.84** (0.60)
Hard peg dummy	–2.44** (0.45)	–2.04** (0.49)	–2.64** (0.53)	–2.85** (0.46)	–1.90** (0.48)
Floating dummy	0.73 (0.40)	1.12* (0.51)	0.77 (0.45)	3.73** (0.63)	0.65 (0.53)
Lagged inflation	0.522** (0.04)	0.519** (0.04)	0.506** (0.05)	0.443** (0.05)	0.505** (0.05)
Year dummies?	Yes	Yes	Yes	Yes	Yes
Standard error	5.00	4.98	5.23	4.84	4.96
Sample size	1323	1323	1042	1061	885
No. of countries	92	92	85	74	91
Time period	1984–2001	1984–2001	1984–2001	1984–2001	1990–2001

Notes. The dependent variable is the transformed percentage change in the CPI since the previous year [$100p/(100+p)$, where p is the raw percentage change]. Observations with $p > 40$ per cent p.a. are excluded. The hard peg dummy is identical across classification schemes. Excluded category is soft peg. Figures in parentheses are standard errors adjusted for heteroscedasticity and serial correlation. ** - significant at 0.01; * - significant at 0.05.

[7] Both the RR and YS classifications have a narrower country coverage than the others, but this is not important here. Using a sample of observations that is common to all classifications other than BR produces similar results (Bleaney and Francisco, 2007b).

5. EXCHANGE RATE REGIMES AND GROWTH

In this section we look at how per capita growth varies across exchange rate regimes at the end of the previous calendar year, using a similar specification to that used for inflation. We exclude all observations where per capita growth is outside the range -10 per cent to +15 per cent, as these outliers are likely to be associated with civil wars and other disturbances, or the immediate recovery from them, and could seriously distort the results. Panel A of Table 4 shows the results excluding the inflationary crisis observations with freely falling exchange rates, which are known to be associated with slow growth (Reinhart and Rogoff, 2004). Panel B includes these observations as a separate regime category, and also shows the effects of not separating hard from soft pegs.

In Panel A, the main finding is that hard pegs are associated with significantly slower growth than soft pegs for every classification scheme. The difference is economically significant – at least 0.7 percentage points p.a. in the short run and about one percentage point (= 0.7/(1 – 0.3)) in the long run. Since there have been so few regime switches to and from hard pegs, this could just be the effect of hard pegs happening to be in countries that are slow-growing for other reasons (we discuss this further below).[8] The floating dummy is significant only in the case of the RR classification, and very markedly so, with an estimated short run coefficient of –1.1 percentage points.

In Panel B, the coefficient of the floating dummy is slightly more positive (or less negative) than in Panel A, because the omitted category is now all pegs and not just soft pegs. In fact this makes the floating dummy significantly positive for the LYS classification, consistent with the results of Levy-Yeyati and Sturzenegger (2001, 2003). Observations with inflation over 40% p.a. are characterised by slower growth in most classifications.

[8] We show in Bleaney and Francisco (2007b) that, in a regression with fixed country effects, the hard-peg effect loses statistical significance.

Table 4. Per Capita Growth and Exchange Rate Regimes

	CLASSIFICATION SCHEME				
	IMF	JS	LYS	RR	BOR
	Panel A. Omitting high-inflation observations				
Constant	0.96∗ (0.41)	1.10∗∗ (0.41)	0.82 (0.46)	0.97∗ (0.42)	1.12∗∗ (0.41)
Hard peg dummy	–0.73∗ (0.35)	–0.87∗∗ (0.34)	–0.68∗ (0.32)	–1.02∗∗ (0.33)	–0.89∗∗ (0.27)
Floating dummy	0.06 (0.26)	–0.17 (0.26)	0.31 (0.26)	–1.07∗∗ (0.28)	–0.22 (0.29)
Lagged per capita growth	0.293∗∗ (0.05)	0.293∗∗ (0.05)	0.318∗∗ (0.05)	0.288∗∗ (0.05)	0.288∗∗ (0.06)
Standard error	3.57	3.57	3.51	3.38	3.34
Sample size	1260	1260	994	1023	864
No. of countries	93	93	86	74	92
	Panel B. Including high-inflation observations and combining hard and soft pegs				
Constant	0.54 (0.38)	0.58 (0.38)	0.44 (0.44)	0.44 (0.40)	0.62 (0.37)
Floating dummy	0.35 (0.24)	0.24 (0.24)	0.52∗ (0.25)	–0.78∗∗ (0.30)	0.18 (0.26)
High-inflation dummy	–1.11∗∗ (0.42)	–1.07∗ (0.42)	–1.20∗∗ (0.42)	–0.68 (0.48)	–0.90 (0.50)
Lagged per capita growth	0.275∗∗ (0.05)	0.276∗∗ (0.05)	0.299∗∗ (0.05)	0.287∗∗ (0.05)	0.283∗∗ (0.05)
Standard error	3.67	3.67	3.63	3.53	3.43
Sample size	1387	1387	1102	1131	928
No. of countries	93	93	86	74	93
Time period	1984–2001	1984–2001	1984–2001	1984–2001	1990–2001

Notes. The dependent variable is *per capita* GDP growth, with observations outside the range –10 to +15 per cent excluded. High-inflation observations are those with inflation > 40 per cent p.a. The hard peg dummy is identical across classification schemes. Excluded category is soft peg (panel A) or all pegs (Panel B). Year dummies are also included in the regression. Figures in parentheses are standard errors adjusted for heteroscedasticity and serial correlation. ** - significant at 0.01; * - significant at 0.05.

6. FURTHER DISCUSSION

The most striking feature of these results is the outlying nature of the RR classification, which suggests much worse outcomes for floating (higher inflation, lower growth) than any other classification. Alesina and Wagner (2006) find that countries which claim to peg (according to the IMF) and actually float (according to RR) have poor institutional quality relative to those that claim to float and are classified by RR as a peg. That suggests some unanticipated biases in RR's float classification, which might be exacerbated by its relative rarity. In this section we investigate this a bit further.

Table 5 shows that, in the sample of observations with inflation under 40% that are not hard pegs, the RR classification is much more likely to identify a float if the inflation rate is over 25% than if it is under 25%, or in a country which has had inflation over 40% in at least one year in the sample. Other classification schemes do not display the same bias.

Table 5. Classification of high-inflation observations

	Inflation rate		Countries with:	
	> 25 %	< 25 %	At least one year of inflation > 40 %	No years of inflation > 40 %
Number of observations	71	546	237	381
Classification scheme	*Proportion of observations classified as floats*			
IMF	0.69	0.59	0.67	0.56
JS	0.76	0.71	0.71	0.71
YS	0.45	0.46	0.33	0.53
RR	0.68	0.23	0.42	0.19

Notes. Observations with inflation > 40 per cent p.a. are excluded. The sample is the 898 observations common to all four schemes, with the 279 hard peg observations excluded.

A distinctive feature of the RR classification is its use of parallel exchange rates. For many countries parallel rates stay close to official rates, and for those countries the use of parallel rates probably makes little difference (in other words the RR classification would identify fewer floats even if it used official rates). For some observations, however, the parallel-market premium on foreign currency is large. We have constructed a dummy variable that takes the value of one if this premium exceeds 50%, and zero otherwise. Table 6 reports a probit regression of the probability of a float classification (the alternative being a soft peg) as a function of this parallel-market premium dummy and a dummy for inflation over 25%. The RR classification is distinctive both in the strength of the inflation effect and in the positive coefficient on the parallel-market premium (according to most other classifications, a high premium indicates a higher probability of a peg). According to Table 6, in the RR classification inflation over 25% makes a float 39% more likely, and a large parallel-rate premium makes a float 31% more likely.

Table 6. Analysis of the probability of a float classification

	Classification scheme				
Independent variables	IMF	JS	YS	RR	BOR
Dummy for inflation > 25%	0.256** (0.048)	0.139** (0.042)	0.215** (0.057)	0.390** (0.056)	0.134* (0.064)
Dummy for parallel rate premium > 50%	–0.271** (0.037)	–0.238** (0.042)	–0.202** (0.043)	0.307** (0.047)	0.016 (0.058)
Sample size	1051	1051	771	783	703
Period	1984-2001	1984-2001	1984-2001	1984-2001	1990-2001

Notes. The table shows estimated marginal effects of a switch of each dummy from 0 to 1 in a probit regression. Figures in parentheses are standard errors adjusted for heteroscedasticity and serial correlation. Sample excludes hard pegs and observations with inflation > 40%. ** denotes significant at 0.01; * denotes significant at 0.05.

The regional distribution of floats is also unusual in the RR classification, as Table 7 shows. This classification identifies a particularly low proportion of floats in East and South Asia (the fastest-growing region) and a particularly high proportion in the slowest-growing one (sub-Saharan Africa).

Table 7. Regional distribution of float classifications

	Regional distribution of floats identified by the classification				
Classification	Sub-Saharan Africa	Western Hemisphere	East and South Asia	Middle East & North Africa	All
IMF	0.319	0.325	0.254	0.102	1
JS	0.372	0.244	0.286	0.099	1
YS	0.272	0.401	0.218	0.109	1
RR	0.541	0.279	0.064	0.116	1
BR	0.425	0.327	0.215	0.033	1

Notes. Observations with inflation > 40% excluded. The table shows the proportion of all floats that are identified by the classification that fall in the region shown (N.B. not the proportion of all observations in that region that are floats).

Are these factors sufficient to account for the outlying results obtained with the RR classification? Table 8 shows that the answer is no. The RR float dummy has a less negative coefficient when we allow for these factors, but it is still statistically significant. Note also that the hard peg effect is less significant than before.[9] That is because hard pegs also have an unfavourable regional distribution (strongly represented in sub-Saharan Africa, and not at all in this sample in East and South Asia).

The fact that in these exercises the RR classification produces such different results from other classifications, even *de facto* ones, does not necessarily mean that its statistical algorithm is without merit, but it does raise some questions about its reliability.

[9] The loss of significance is mainly because of a reduction in the estimated coefficient, rather than an increase in the standard error.

Table 8. Per Capita Growth and Exchange Rate Regimes with Additional Controls

	CLASSIFICATION SCHEME				
	IMF	JS	LYS	RR	BOR̤
Constant	0.88 (0.50)	0.98∗ (0.49)	0.83 (0.53)	0.66 (0.53)	1.12∗∗ (0.38)
Hard peg dummy	–0.57 (0.32	–0.71∗ (0.34)	–0.28 (0.33)	–0.68∗ (0.30)	–0.59 (0.35)
Floating dummy	0.07 (0.22)	–0.14 (0.24)	0.30 (0.24)	–0.64∗ (0.32)	–0.09 (0.27)
Sub-Saharan Africa dummy	–0.24 (0.40)	–0.19 (0.40)	–0.65 (0.45)	–0.23 (0.50)	–0.21 (0.48)
Western Hemisphere dummy	0.30 (0.38)	0.35 (0.38)	0.07 (0.43)	0.35 (0.43)	0.17 (0.46)
East and South Asia dummy	0.69 (0.40)	0.74 (0.40)	1.03∗ (0.45)	1.18∗ (0.46)	0.78 (0.45)
Dummy for inflation > 25%	–0.89∗ (0.39)	–0.85∗ (0.39)	–0.62 (–0.19)	–0.39 (0.41)	–0.83 (0.43)
Dummy for parallel-rate premium > 50%	–0.21 (0.35)	–0.25 (0.35)	–0.08 (0.43)	–0.32 (0.39)	0.49 (0.46)
Lagged per capita growth	0.270∗∗ (0.03)	0.276∗∗ (0.03)	0.283∗∗ (0.04)	0.260∗∗ (0.04)	0.283∗∗ (0.04)
Standard error	3.55	3.55	3.47	3.46	3.32
Sample size	1260	1260	994	1023	864
No. of countries	91	91	85	74	91
Time period	1984–2001	1984–2001	1984–2001	1984–2001	1990–2001

Notes. The dependent variable is *per capita* GDP growth, with observations outside the range –10 to +15 per cent excluded. Observations with inflation > 40% p.a. are excluded. The hard peg dummy is identical across classification schemes. Excluded category is soft peg. Excluded region is Middle East and North Africa. Year dummies are also included in the regression. Figures in parentheses are heteroscedasticity-robust standard errors. ** - significant at 0.01; * - significant at 0.05.

7. CONCLUSIONS

If the declared exchange rate regime is an obvious fiction, there is a strong case for using some form of *de facto* classification scheme. There are, however, many issues in constructing such schemes, such as: the precise nature of the statistical algorithm; how to allow for periodic devaluations; whether to take account of policy interventions, such as movements in foreign exchange reserves; setting maximum band widths; the time span over which the regime is evaluated; and whether to take account of parallel rather than official exchange rates. In practice, because the authors of alternative schemes for classifying exchange rate regimes have approached these issues markedly differently, alternative schemes disagree with each other as much as with the official classification.

We have shown that, when it comes to the correlation between the exchange rate regime and inflation and growth in developing countries, these differences are not always important. Three out of four alternative schemes agree with the official classification in suggesting that growth rates in developing countries are similar under soft pegs and floats, and that inflation rates are not very different either. Hard pegs, in which adjustment of the parity is inhibited either by legal barriers (currency boards) or the need for the agreement of other countries (a common currency), are associated with lower inflation and slower growth than other regimes, but there have been so few switches to and from hard pegs that it is impossible to distinguish clearly between a regime effect and fixed country effects.

The result of Levy-Yeyati and Sturzenegger (2001, 2003) that floating is associated with significantly higher growth than pegs seems to lack robustness. We can reproduce this finding only by not separating out hard pegs, and even then only with their classification scheme.

The Reinhart-Rogoff (2004) classification produces outlying results that are very unfavourable to floating. This is partly explained by a bias of their floats towards countries with inflationary problems, and in slow-growing regions (sub-Saharan Africa) and away from fast-growing ones (East and South Asia), but the difference is still significant after allowing for these effects. There must therefore be a concern that the statistical algorithm used to identify floats in this classification has the unfortunate side-effect of picking out episodes of poor macroeconomic performance. The use of parallel rates is probably of significance here. Parallel rates tend to be most volatile when there is a large parallel-market premium, which is often an indicator of inconsistent monetary and exchange rate policies.

APPENDIX

Countries in the sample (in alphabetical order of World Bank country code):

Argentina	Burundi	Benin	Burkina Faso
BGD	Bahrain	Belize	Brazil
Bhutan	Botswana	Central Afr. Rep.	Chile
Côte d'Ivoire	Cameroon	Rep. of Congo	Colombia
Cape Verde	Costa Rica	Dominica	Dominican Rep.
Algeria	Ecuador	Egypt	Ethiopia
Fiji	Gabon	Ghana	Gambia
Guinea Bissau	Grenada	Guatemala	Guyana
Honduras	Haiti	Indonesia	India
Iran	Jamaica	Jordan	Kenya
Laos	St Lucia	Sri Lanka	Morocco
Madagascar	Maldives	Mexico	Mali
Myanmar	Mauritania	Mauritius	Malawi
Malaysia	Niger	Nigeria	Nicaragua
Nepal	Oman	Pakistan	Panama
Peru	Philippines	Papua New Guinea	Paraguay
Rwanda	Saudi Arabia	Sudan	Senegal
Solomon Islands	Sierra Leone	El Salvador	Suriname
Swaziland	Seychelles	Syria	Chad
Togo	Thailand	Trinidad & Tobago	Tunisia
Turkey	Tanzania	Uganda	Uruguay
St Vincent & Gr.	Venezuela	Vanuatu	South Africa
Dem. Rep. Congo	Zambia	Zimbabwe	

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